

Original communication

Fatal burns in Manipal area: A 10 year study

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Abstract

The purpose of this study was to record and evaluate the causes and the magnitude of the fatal burn injuries retrospectively. An analysis of autopsy records revealed 19.4% cases of burn injuries amongst the total autopsies done over 10 years period (1993–2002) in the mortuary of the department of Forensic Medicine of Kasturba medical College, Manipal. The majority of deaths (78.5%) occurred between 11 and 40 years of age group with preponderance of females (74.8%). The flame burns were seen in 94.1% of the victims followed by scalds and electrical burns in 2.8% and 2.5% cases, respectively. The majority of burn incidents were accidental (75.8%) in nature followed by suicidal (11.5%) and homicidal (3.1%) deaths. The percentage of burn (TBSA) over 40% were observed in most of the cases (92.5%). The majority of deaths occurred within a week (69.87%) and most the victims died because of septicemia (50.9%).
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1. Introduction

Burn deaths are an important public health problem in a developing country like India. Though injury caused by burn is one of the most important preventable causes of prolonged illness and death, it has failed to catch the attraction of both of medical profession and lay public, only because the colossal losses of life, money and time are not eyecatching like epidemics of infectious diseases, that sweep away number of lives in a short time. In a developing countries burn injuries are most often related to accidents.^{1–3} A number of studies on various aspects of burn have been reported from various part of India, but there is lack of informations especially on fatal victims from the Manipal area of Southern India. Kasturba Medical College Hospital, Manipal being the tertiary care centre receives many burn cases from various districts of South Karnataka. The Present study is based on a 10 years retro-

spective study (1993–2002) of fatal burn cases at autopsy from Kasturba Medical College mortuary, Manipal.

2. Material and methods

Of the 1661 autopsies performed on all types of unnatural deaths between 1st January 1993 and 31st December 2002, 322 (19.4%) were the cases of burns. These 322 fatal burn cases form the material of this study. All autopsies were carried out in the mortuary of department of forensic Medicine of Kasturba Medical College Manipal.

An in-depth examination of the epidemiological features and medicolegal aspects of these 322 burn deaths was performed in an effort to more clearly understand the dynamics surrounding these deaths. Retrospective data were collected from the autopsy reports of the department, case sheets from the hospital and the inquest reports from police. All the records revealed various information pertaining to their age, sex, address, manner, type, extent, survival period, and the cause of death. These all data were compiled, analyzed and discussed.

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3. Results

Amongst 1661 cases of total autopsy done, only 322 (19.4%) were the victims of burn showing no definite ascending or descending time trend. Similarly there was no definite mortality trend as well seeing the total burn admission and burn death.

Two hundred and ninety eight of the 322 victims sustained more than 40% of total body surface area (TBSA) burn (Fig. 1), mostly being in the females at home.

One hundred and ninety six of the victims (61%) died within a week of the incident (Table 1).

Majority of the victims died due to complications of burns [Septicaemia – 167 (50.9%), multi-organ failure – 55 (17%), neurogenic shock – 39 (12%), hypovolumic shock – 33 (10.2%) and others – 31 (9.6%)].

The overwhelming majority of the victims (94%) sustained flame burn (Fig. 2), most of them being in the age group of 11–40 years (Fig. 3). Electrical burns were seen only in male victims 8 (2.5%), whereas 2 were the case of chemical burn (one in male and one in female).

More than three quarters of the incidents were accidental in nature (Table 2), almost all dying in the hospital.

Two hundred and forty one of all the victims were females most of them being in the child bearing age group.

About 80% of the victims were Hindu by religion hailing usually from an urban locality.

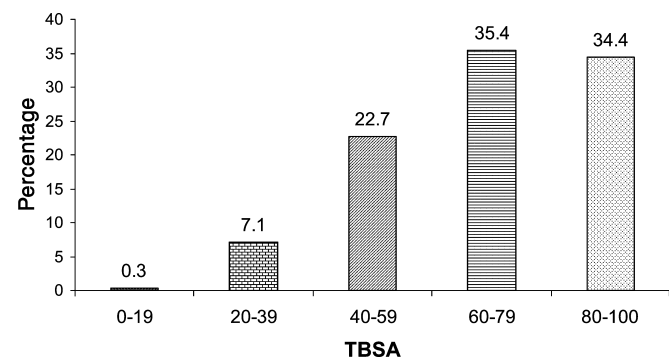


Fig. 1. Percentage of burn.

Table 1
Survival period of the victim

Survival period	No.	% Age
<1 day	27	8.4
1–3 days	43	13.3
3–5 days	70	21.7
5–7 days	56	17.4
1 week–1 month	103	31.9
>1 month	2	0.6
Not known	21	6.5
Total	322	100

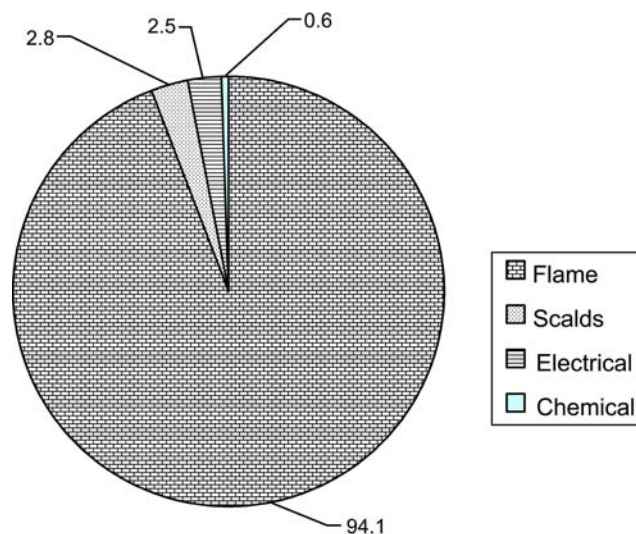


Fig. 2. Type of burn.

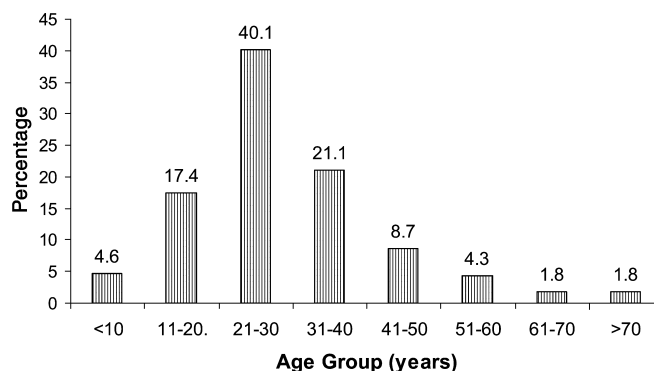


Fig. 3. Age group of the victim.

Table 2
Manner of death

Manner	Male	Female	Total	Percentage
Accident	65	179	244	75.8
Suicide	8	29	37	11.5
Homicide	2	8	10	3.1
Not known	6	25	31	9.6
Total	81	241	322	100

4. Discussions

Burns in developing countries like India is endemic and continues to be a major challenge to the health care provider and society. Though there is no time trend in the Manipal area, yet it constitutes 19.4% of the total deaths coming for autopsy at mortuary.

In the present study, about 78% of the victims were in the age group of 11–40 years, which are similar to the observation of Singh et al.⁴ from Chandigarh who

reported two thirds of fatal burn cases in the young age group (21–40 years). From Madras Jayaram et al.⁵ have also reported peak incidence of burn death in young adults. In Jaipur⁶ 65% of burn admissions were adolescents and young adults. Studies from Kashmir⁷ and Bombay⁸ have also reported higher mortality in young persons. In other countries such as Iran⁹ 93% of burn victims were below 60 years with peak incidence between 16 and 25 years whereas children were the commonest victims from Angola,¹⁰ Scotland¹¹ and Jordan.¹² But in Spain¹³ contrary to these 61.5% of patients were over 40 years of age.

The higher incidence of burn deaths amongst females was observed throughout the study period and is usually related to the compromised working environment in the in-laws house especially for cooking, leading to accidental burn or sometimes dowry disputes, marital disharmony, sexual jealousy, etc. leading to suicidal or homicidal episode. Eighty two percent of female burn victims were observed from Varanasi.¹⁴ Higher incidences of female burns in India have also been reported by many authors.^{4,6–8} Studies from Kashmir⁷ and Algeria¹⁵ shows that young adults (both male and female) are at higher risk than average of death from burns and that the risk is greater in amongst females than males. But two other hospital based studies from India^{16,17} reporting an increased risk in young adults shows no difference by gender while a similar study from Libya¹⁸ reports higher rates among children and no difference at any age by gender. In Egypt and also in Mauritius¹⁹ women in childbearing age were reported to at higher risk while in some other countries (Argentina, Thailand, Uruguay and Saudi Arabia) about 70% of burn victims are male.^{19,20} In Spain burn cases were observed to be more common among males in all age groups except in the elderly.¹³ Population based study from developed countries, on the other hand report higher rates of burn injury among the young and the old and a slight preponderance of males.^{21–23}

Though the majority of the incidents are accidental in nature, suicidal and homicidal cases were also observed. Maya Natu et al.²⁴ in their study reported 89% accidental, 4% suicidal and 0.16% homicidal victims. Similarly accidental, suicidal and homicidal nature of burn deaths in females have also been reported by Kumar et al.^{25–27}

In the present series, the overwhelming majority (92.5%) of the victims had more than 40% of total body surface area (TBSA) burn indicating the incompatibility with life even at a tertiary care center. Moreover, in 54% of the suicidal victims TBSA were more than 80% as compared to the total victims where it is only in 34%. This again shows the definite mortality in suicide even in this big hospital. Studies from Angola¹⁰ revealed 100% mortality over 40% TBSA. And similarly 80% mortality rate in burn over 40–50% TBSA has been reported from Jaipur, Albania and Saudi Arabia.^{6,28}

About 80% of the victims were Hindu by religion, which is in accordance with the religious mix of the society. And

maximum number of cases were from the urban locality as according to the catchment area.

Flame is the major cause of burn, which is consistent with the study from Madras.⁵ Contrary to this, scalds were reported to be the major cause of fatality from Angola, Ivory Coast and Jordan.^{10,29,30}

The majority of deaths (60.8%) occurred within a week signifying that the burns are rapidly fatal. Similarly Ragheb et al.²⁹ also reported death from burns within a week in 58% victims. Vilasco and Bondurand³⁰ in their study reported 40% burn deaths between 3 and 7 days of the incident.

In all cases, septicemia was the leading cause of death as also reported by Ragheb et al.,²⁹ Saleh et al.¹⁹ and Singh et al.⁴ Other causes were bronchopneumonia, toxemia, etc. as also mentioned in the result.

5. Conclusions

The present study highlights the following features pertaining to the burn deaths:

1. Peak incidence of mortality is in adolescent and young age groups (11–40 years).
2. Majority of the burn victims are females in child bearing age.
3. Accidents were the major cause of burn.
4. Flame burn was the commonest occurrence.
5. Majority of deaths occurred within a week of the incident.
6. Most of the fatal victim had more than 40% TBSA.
7. Septicemia was the major cause of burn death.
8. Majority of the victims was Hindu from urban area.

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